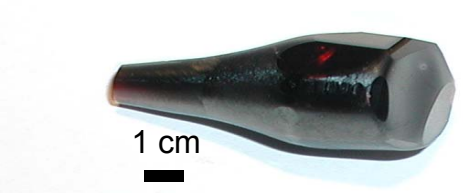
Crystal Growth and Energy Transfer in Cr^{2+}:CdSe and Cr^{2+}:CdS_xSe_{1-x}

Arnold Burger, Fisk University, DMR-0097272

A new solid-state infrared laser material, based on a solid-solution ternary selenide host was discovered in this project. These eyesafe sensors are used for a variety of purposes including biochemical sensors, pollution monitoring (ozone, particulate matter and industrial emissions), atmospheric trace gas monitoring (ex. water vapor) and meteorological studies and wind sensing (detection of aviation hazards such as clear air turbulence, wind shear and wake vortexes). These light sources can be operated at room temperature, have the advantage of compactness, low weight and cost, as well as tunability in a wide spectral range.



Photograph of a crystal of Cr^{2+} :$CdS_{0.8}Se_{0.2}$ grown at Fisk

Fisk student next to the crystal growth system he helped build.

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Education:

This project provides education and mentoring of undergraduate and graduate students which are under-represented in physics and in materials science. group provides training of minority students in materials research. Supported by this NSF grant were: Damon Hillman, graduate student (MA, May 2002, presently in the PhD program at Alabama A&MU), Cleon Barnett, student (MA, May 2002, presently in the PhD program at Florida A&MU), Timi Adetunji (BA, May 2002, presently in the PhD program at Ohio State) and Naima Jacobs-El (BA magna cum laude, June 2003). Several Fisk undergraduates (Morrow, Jacobs-El, Jones and Johnson) also participated in research.

Outreach and service to scientific community:

• This project provides education and mentoring of undergraduate and graduate students which are under-represented in physics and in materials science. Four summer interns (undergrad freshmen) from Shaw University, Morgan State University, Trevecca Nazarene University and Prairie View A&M University were trained in crystal growth and characterization during the REU summer program

• The PI has organized the US Workshop on the Physics and Chemistry of II-VI Materials, New Orleans, Louisiana, September 17-19, 2003, see website: http://www.ii-viworkshop.org/committee.html